

Weekly Report – week of July 18, 2011  
Fabrication and Assembly of ERL hardware  
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**Cryogenics:**

Transfer line ERL side:

LESHC-PCSS Pressure and Cryogenic Safety Subcommittee review scheduled for Aug 11. LN2 main feed line spools is under manufacturing at vendor. Multi-line Cryoduct is under manufacturing at vendor. Valve boxes for 5cell and SRF Gun.

Transfer lines cryoplant side: Weld inspection: Weld inspector rescheduled for this coming week.

Vertical test dewar side:

½inch warm helium supply line from compressor HP supply to Vertical test dewar for purge/warmup has been installed. Metering valve to be installed on this line. 1" Vent lines to be continued.

Compressed Air System:

New instrument Air Dryer: Engineer met with facilities plumber group for installation of dryer.

Cryoplant system: Preps underway for pressure testing of warm lines

**Controls:** Due to personnel availability, power supply testing is expected to begin early next week. As the ERL is expected to require more than ten separate firewire-based cameras (though only about four would be actively used at any given time), technical issues with hosting multiple cameras per host PC are being investigated.

This includes attempting modifications of the installation of the current firewire software library and testing the use of more than one firewire interface card per host.

**Instrumentation:** A preliminary I/O list has been communicated to the controls group. Improvements to our YAG screen illumination efforts include using optical filters to keep the test UV laser noise out of the CCD camera. The zig-zag plunging profile monitor design is improving with an expansion to the port's vertical dimension to accommodate a larger YAG screen. Drawings for the next generation prototype DCCT capacitive bypass assembly were released this week for fabrication. A contingency plan has been realized to acquire blank vacuum cubes as place holders for the profile monitors in the event there is further slippage of the supplier's schedule.

**Photocathode:** Found leak around the 14" conflat gasket and was repaired by tightening the bolt pattern. Have re-established low  $10^{-10}$  scale vacuum again in main chamber.

**Laser:** Trying to find a solution for a laser hardware problem. The stepper motor controller that sets the coarse position of the mirror that determines laser repetition rate is defective. the vendor is in Germany, a subcontractor to the laser

vendor, and repair rates, contractual and customs complications are making repair look as expensive as replacement (800-1000 euros). As the defective module is a stepper motor controller that is not actually in the feedback loop, I am also looking into other options (in-house repair, 3rd party controllers). Laser still functions adequately for other tasks however, and I am constructing a frequency doubling setup to measure the 266 nm generation efficiency we can expect for the first phase of the G5 test. A replacement crystal for the 532 nm production in the laser has also been procured, and shipped this week (cost is covered by the vendor).

**Large Grain Gun:** Top plate returned. Uni-strut stand mounting to be completed at 905.

**Vacuum:** ERL Zig-Zag Beam line: Detail design progressed to the point of confidence in chamber mounting provisions, allowing for the final detailing of the chambers which continues. The two 30 degree dipole chambers are currently being redesigned to accommodate plunging profile monitors with YAG screens. Modifications to the DCCT support will also be needed to accommodate the new instrumentation.

ERL G5 Beam line: Processing of all chambers and vacuum components for G5 are complete except for the new spool pipe needed to provide space for conventional mounting of the high energy profile monitor. Chamber subassembly continues in the 905 clean room. The first downstream profile monitor/ion pump assembly and triplet chamber are complete. The downstream beamlines can be installed once stands and magnets are installed and surveyed. The downstream beamline installations can be complete once the remaining 2 high-energy profile monitors are received, inspected and accepted. Upstream chamber subassemblies in 905 clean room are underway, beginning with chambers requiring BPM buttons and small ion pumps. Time permitting a laser mirror holder thermal stability test is planned prior to final subassembly of the laser/ion pump cross.

ERL Laser Transport: All material is available to fabricate the laser transport line minus the newly designed viewport holders. A prototype was built and tested. It allows for rapid change of viewports and doesn't require expensive brazed flanges. 6 viewport holders will be fabricated.